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THE USE OF BIOLOGICAL WARFARE AGENTS IN PUBLIC WATER SUPPLIES

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THE USE OF BIOLOGICAL WARFARE AGENTS IN PUBLIC WATER SUPPLIES[1]

Keith H. Lewis[2]

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Summary

A. Biological warfare constitutes a serious threat to public water supplies because:

1. A wide variety of potential agents is compatible with water and can be provided readily for operational use. (See Tables 1 and 2)

2. Activities of military significance can be disrupted by illness or death of the population without destruction of physical facilities vital to restoration of the community.

3. BW agents are ideally suited for use by saboteurs, as well as for large scale overt attacks; however, the former is the greater threat to most water supplies.

4. Present defensive measures are inadequate to prevent contamination of urban water supplies or to control the damage thus inflicted.

B. Public water supplies are highly vulnerable to biological warfare because:

1. Location, importance, and detailed information about major supplies are readily available to potential enemies.

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[1] The opinions expressed are the speaker's and do not necessarily represent the views of the Federal Civil Defense Administration, the Department of Health, Education, and Welfare, or any other Governmental agency.

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2. Water is well adapted to dissemination of BW agents.

3. Accessibility of critical points cannot be controlled satisfactorily.

4. Knowledge of means for by-passing or overcoming normal safeguards is easily acquired and applied.

5. Most members of the community drink water frequently, thus incurring a high degree of risk.

6. Rapid methods of detection are not available.

7. Medical measures are inadequate to prevent or to cope with large numbers of cases occurring simultaneously and without warning in a community.

C. Defensive measures against contamination of water supplies by BW (Table 3) are mostly nonspecific, cumbersome, costly, and of questionable effectiveness, but appreciable reduction in hazard and some psychological benefit can be attained by proper application of well known practices, such as:

1. Maintenance of free chlorine in all parts of the distribution system.

2. Continuous measurement of chlorine residuals in the distribution system.

3. Recommendation of appropriate emergency action for the consumer.

4. Development of disaster control procedures, including arrangements for special tests to identify BW agents and emergency sources of supply.

D. Intensification of research and development efforts to reduce the vulnerability of water supplies is urgently needed.

Table 1

Characteristics of an Ideal Anti-Personnel BW Agent
for Use in Water Supplies

1. Small doses effective by mouth.

2. Causes serious and prolonged incapacitation or death.

3. Target population susceptible.

4. Capable of being transmitted to contacts.

5. Relatively short incubation period.

6. Easily produced in large amounts and in a concentrated form which is readily dispersible in water.

7. Stable during storage and transportation.

8. Survives for prolonged periods in natural waters.

9. Resistant to common water treatment processes, especially chlorination.

10. Difficult to detect.

11. Specific preventive or curative measures not available.

Table 2

Some Common Diseases of Man Which the Medical Literature Indicates May be Acquired by the Oral Route

Class of Causative Agent	Disease
A. Toxins	1. Botulism
	2. Staphylococcal intoxication
	3. Mushroom poisoning
	4. Plankton poisoning (algae and protozoa)
	5. Poisoning produced by products of higher plants and animals (Ricin, alkaloids, etc.)
B. Bacteria	6. Diphtheria
	7. Typhoid fever
	8. Paratyphoid fevers
	9. Cholera
	10. Bacillary dysentery
	11. Tularemia
	12. Anthrax
	13. Brucellosis
	14. Tuberculosis
	15. Streptococcal infections
	16. Actinomycosis
C. Rickettsiae	17. Q fever
D. Viruses	18. Infectious hepatitis
	19. Poliomyelitis
	20. Smallpox
E. Molds and Yeasts	21. Histoplasmosis
	22. Moniliasis
F. Parasitic animals	23. Amoebic dysentery
	24. Trichinosis
	25. Ascariasis

Table 3

Defense of Urban Water Supplies Against BW

Parts of Supply System	Relative Vulnerability to BW	Applicable Protective Measures
Sources	+	1. Denial of access by physical means. 2. Inspection and patrol. 3. Multiple and reserve sources. 4. Sampling and special tests.
Transmission Conduits	++	1. Denial of access by physical means. 2. Inspection and patrol. 3. Records of operation. 4. Investigation of employees. 5. Sampling and special tests.
Treatment Plant	+++	1. Denial of access by physical means. 2. Inspection and patrol. 3. Investigation of employees. 4. Continuous operating records. 5. Frequent sampling and special tests. 6. Efficient operation. 7. Plans and resources for emergency operations.
Distribution System	++++	1. Prevent access to mains, pumping stations, and reservoirs. 2. Maintain maximum acceptable chlorine level. 3. Sampling network for special tests. 4. Emergency segregation of contamination. 5. Decontamination. 6. Use of reserve sources in emergency.